

1. 次の英文を読み、それに続く設問 A-1 から A-5 までに答えなさい。解答は、それぞれの設問に続く選択肢 1 から 3 までの中から答えとして最も適切なものを一つずつ選び、その番号のマーク欄を塗りつぶしなさい。

Cheap plastic solar cells*¹ that can be painted onto just about any surface could provide power for a range of portable and even wearable electronic devices. The University of California Berkeley has created the first generation of plastic solar cells that could someday replace the expensive, silicon-based cells widely used now. “Our efficiency is not good enough yet by a factor of 10, but this technology has the potential to do better,” said Paul Alivisatos, a professor of chemistry who led the study.

Alivisatos and his team created a hybrid solar cell comprised of tiny nanorods*² dispersed*³ in plastic. The hair-thin layer is sandwiched between electrodes*⁴ and can produce, at present, about 0.7 volts. Unlike today’s silicon-based solar devices, plastic solar cells can be manufactured in a laboratory beaker without the need for clean rooms or vacuum chambers.*⁵ “Today’s high-efficiency solar cells require very sophisticated processing inside a clean room and complex engineering to make the semiconductor*⁶ sandwiches,” Alivisatos said. “And because they are baked inside a vacuum chamber, they have to be made relatively small.”

The beauty of the new solar cells is that they can be painted directly onto plastic. This unlimited flexibility opens up all sorts of new applications, like putting solar cells on clothing to power lights, radios, or small computers.

<注> *¹ cells 電池 *² nanorods 微小ロッド (微細な棒状のもの) *³ dispersed 分散されている
*⁴ electrodes 電極 *⁵ vacuum chambers 真空状態の部屋、室 *⁶ semiconductor 半導体

(設問)

A-1 Why are the new solar cells important?

1. They will soon be replaced by silicon cells.
2. They are 10 times more powerful than previous devices.
3. They can be applied to a wide range of surfaces.

A-2 What problem must be fixed before paint-on solar cells are put into use?

1. Their efficiency must be greatly increased.
2. Their output must be limited for use with household devices.
3. Larger vacuum chambers must be invented.

A-3 How do plastic solar cells differ from silicon-based solar cells?

1. Plastic solar cells were not created in a laboratory.
2. Plastic solar cells use silicon much more efficiently.
3. Plastic solar cells can be made under less strict conditions.

A-4 What is one of the disadvantages of older solar cell designs?

1. The manufacturing process limits their size.
2. They can not match the speed of new computers.
3. In spite of being expensive, their efficiency is limited.

A-5 According to the passage, what new products may appear on the market in the future?

1. Sandwiched semiconductors.
2. Clothing with built-in electronics.
3. Ovens with vacuum chambers.

2. 次の英文 A-6 から A-9 までは、全世界的な海上遭難安全制度に関する国際文書の規定に沿って述べたものである。この英文の内容に最もよく合致しているものを、それぞれの英文に対応する選択肢 1 から 3 までの中から一つずつ選び、解答は、選んだ選択肢の番号のマーク欄を塗りつぶしなさい。

A-6 A distress alert shall be sent only on the authority of the person responsible for the ship, aircraft, or other vehicle carrying a mobile station.

1. A person authorized by the commander of a vehicle may use a mobile station except in an emergency.
2. The person commanding a vehicle must require that there be a mobile station for distress alerts on board.
3. Only the person in charge of a vehicle with a mobile station can make the final decision to send a distress alert.

A-7 A distress alert is false if it was transmitted without any indication that a mobile unit or person was in distress and required immediate assistance.

1. A mobile unit or person must report that it is in trouble and in need of help to have its distress alert considered true.
2. A mobile unit or person no longer needs to be helped after a distress alert is judged to be false unless aid is not required.
3. A mobile unit or person in trouble needs to report its situation to stations receiving actual distress alerts.

A-8 All stations which receive a distress alert transmitted by digital selective calling shall immediately cease any transmission capable of interfering with distress traffic.

1. After a distress alert arrives at a station via digital selective calling, the receiving station must end all communication that could cause problems for further distress traffic.
2. After a distress alert is sent by digital selective calling, the transmitting station must wait for distress messages.
3. After a distress alert is transmitted via digital selective calling, the receiving station must prevent all other stations from using the same frequency.

A-9 A station in the mobile or mobile-satellite service which learns that a mobile unit is in distress shall initiate and transmit a distress alert when the mobile unit is not itself in a position to transmit the distress alert.

1. A station in the mobile or mobile-satellite service should receive and retransmit a distress alert from a mobile unit in an emergency.
2. A station in the mobile or mobile-satellite service must deliver a distress alert to a mobile unit that is having trouble.
3. A station in the mobile or mobile-satellite service must make a distress alert for a mobile unit that is unable to do so itself.

3. 次の設問 B-1 の日本文に対応する英訳文の空欄（ア）から（オ）までに入る最も適切な語を、その設問に続く選択肢 1 から 10 までの中からそれぞれ一つずつ選びなさい。解答は、選んだ選択肢の番号のマーク欄を塗りつぶしなさい。

（設問）

B-1 ドイツ南部において、早朝の時間帯に 7 つのダムが決壊し、ヘリコプターが割れ目に砂囊^{さのう}を投下してダムの漏れ穴を修理した。

In southern Germany, seven dams (ア) in the early morning (イ), and helicopters (ウ) the leaks (エ) dropping sandbags into the (オ).

- | | | |
|--------------|-----------|--------------|
| 1. burst | 2. by | 3. days |
| 4. gaps | 5. hours | 6. poured |
| 7. on | 8. opened | 9. outbreaks |
| 10. repaired | | |

4. 次の設問 B-2 の日本文に対応する英訳文の空欄（ア）から（オ）までに入る最も適切な語句を、その設問に続く選択肢 1 から 10 までの中からそれぞれ一つずつ選びなさい。解答は、選んだ選択肢の番号のマーク欄を塗りつぶしなさい。

（設問）

B-2 本船が視界不良のために小型貨物船と衝突したときは、霧のかかったドーバー海峡を低速で通過中でした。

Our ship (ア) through a (イ) Dover Strait at low speed when it (ウ) (エ) a small cargo vessel (オ) to low visibility.

- | | | |
|--------------|---------------|----------------|
| 1. according | 2. collided | 3. crashing |
| 4. foggy | 5. has passed | 6. mist |
| 7. owing | 8. together | 9. was passing |
| 10. with | | |

5. 次の設問 B-3 の日本文に対応する英訳文の空欄（ア）から（オ）までに入る最も適切な語句を、その設問に続く選択肢 1 から 10 までの中からそれぞれ一つずつ選びなさい。解答は、選んだ選択肢の番号のマーク欄を塗りつぶしなさい。

（設問）

B-3 遭難警報の送信は、移動体又は人が重大かつ急迫な危険に脅かされており、即時の救助を求めていることを示す。

The transmission of a distress alert (ア) that a mobile unit or person (イ) (ウ) by grave and imminent (エ) and requests (オ) assistance.

- | | | |
|----------------|--------------|--------------------|
| 1. are | 2. danger | 3. give indication |
| 4. immediate | 5. indicates | 6. is |
| 7. menacing | 8. quickly | 9. risky |
| 10. threatened | | |